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Syllabus of Lectures



First Aid to the Injured

2d Brigade, N. G., S. N. Y.

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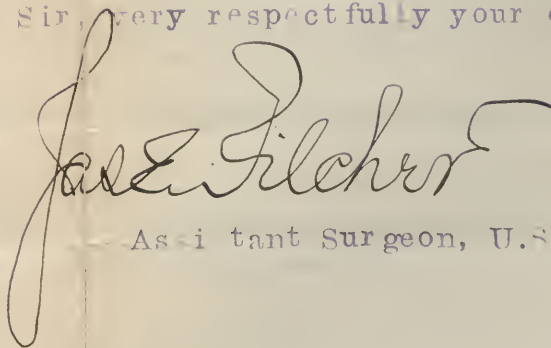
February 23, 1888

The Surgeon General, U.S. Army,

Washington, D.C.

Sir,

I have the honor to transmit by this mail for deposit in the Library of your office, a copy of the very valuable Syllabus of Lectures on First Aid to the Injured for the Use of the Medical Officers of the 2d Brigade, N.G., S.N.Y., prepared by my friend Dr. Fowler, the brigade surgeon. I am, Sir, very respectfully your obedient servant,

A handwritten signature in cursive script, reading "Jesse Filcher". The signature is written in dark ink and is positioned above the typed name and title.

Assistant Surgeon, U.S. Army.

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JAMES L. BERNARD
OFFICE

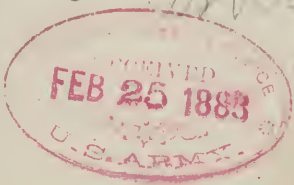
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James E. Pelcher.
Asst Surgeon
U. S. Army

Transmits for deposit
in Library of the I. G. O.,
copy of Syllabus of Lectures
on First Aid to the Injured
for the Use of the Med.
Officers of the 2^d Brig
N. Y. S. A. G., prepared
by Dr Fowler Brigade
Surgeon



1 Enclosure.

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Issued with the approval of the Surgeon-General N. G., S. N. Y.

SYLLABUS
OF
A COURSE OF LECTURES
ON
FIRST AIDS TO THE INJURED
ARRANGED FOR THE
USE OF THE MEDICAL OFFICERS
OF THE
SECOND BRIGADE, N. G., S. N. Y.

BY
GEORGE R. FOWLER,[✓]
MAJOR AND SURGEON, 2D BRIGADE, N. G., S. N. Y.

BROOKLYN, N. Y.



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Annex

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NOTE.

THE SYLLABUS is designed to serve as a means of securing some degree of uniformity in imparting instruction in First Aids to the Injured and kindred duties to the classes formed for that purpose in the Second Brigade of the National Guard of the State. It is intended only as a presentation of a series of suggestions to aid the lecturer in his work, and to enable the class members to follow the lectures in a systematic manner. The interleaved blank pages, it is hoped, will be found useful by the lecturer in noting the introduction of new matter which he may desire to add to the course as here outlined.

The plan of the lectures is essentially the same as that pursued by myself in the course delivered in June, 1886, at the State Camp of Instruction, Peekskill, while there stationed with the 14th Regiment, N. G., S. N. Y.

GEORGE R. FOWLER.

BROOKLYN, N. Y., *January*, 1887.

SYLLABUS OF LECTURES.

LECTURE I.

SKELETON.

Bones form a basis or foundation of the body. Hard, firm, durable. Most permanent parts of the whole body. Support and move the body; surround and protect delicate organs.

Division of Skeleton into Three Parts.

- | | |
|--------------------|--|
| <i>I.—Head.</i> | { Skull-cap. |
| | { Face. |
| <i>II.—Trunk.</i> | { Back-bone, or spine. |
| | { Ribs and breast-bone. |
| | { Pelvis. |
| <i>III.—Limbs.</i> | { Bones of shoulder, arm, forearm and hands. |
| | { Bones of thighs, legs and feet. |

I. THE HEAD.—Number of bones forming skull-cap. Number of bones forming face. All with one exception firmly joined with each other. Skull encloses and protects one of the chief organs of life. Face contains many of the organs of special sense.

II. THE TRUNK.—Back-bone, spine or spinal column. Surrounds and protects spinal marrow. Importance of this protection. Cord is continuous with brain. Why called "*spine*." Consists of twenty-four bones. Carries head, arms and rest of trunk. "*Buffers*," or intervertebral substance. Uses of the latter.

Ribs, Breast-Bone and Back-Bone form chest. Number of ribs. How ribs and breast-bone attached together. How many true and how many false ribs. Ribs protect heart and lungs, and give form to chest, and assist in breathing. Fastened behind by hinge-like mechanism, giving but limited motion; but full play at sides and in front. Cavity of chest separated from that of the abdomen by diaphragm, a large flat muscle, which, by rising and falling is chief factor in mechanism of respiration.

The Pelvis is interposed to afford a firm and steady support to the other portions of the trunk. Also connects it to lower extremities by joints. Made up of three large bones, forming a wide cavity.

III. THE LIMBS.—Upper and lower limbs, called arms and legs.

<i>Upper Limb.</i>	{ Shoulder-blade (<i>scapula</i>). Collar bone (<i>clavicle</i>). Large arm bone (<i>humerus</i>). Two bones of the forearm (<i>radius and ulna</i>). Small bones of wrist and hand.
<i>Lower Limbs.</i>	{ Thigh bone (<i>femur</i>). Knee-cap (<i>patella</i>). Two bones of the leg (<i>tibia and fibula</i>). Small bones of the ankle and foot.

Difference in manner of attachment of upper and lower limbs to trunk. Former through shoulder blade.

JOINTS.—Definition of. Uses of joints. How bones forming joints are connected together. Ligaments. Cartilage. Synovial membrane, and what it secretes. The functions of the latter. Movable joints, immovable joints and mixed joints.

MUSCULAR SYSTEM.

Muscle is the reddish, or “*lean*” portion of animal tissue. Endowed with peculiar property, viz., *contractility*. Uses of muscles. Do not wear out. Instance: Athletes, mechanics, etc. Voluntary muscles, or those over which will exercises control. Examples. Involuntary muscles, or those whose

action is not under control of the will, as, for instance, the heart, stomach and intestines.

Muscles arranged in layers, so as to move parts to be acted upon in the most advantageous manner.

NERVOUS SYSTEM.

Brain, Spinal Cord, Nerves, Ganglion.

<i>Brain.</i>	{	Cerebrum.	{	Brain proper. Fills up almost whole cavity of skull. Seat of intellect, the emotions and will.
		Cerebellum.		Small brain. Lies at back of head. Regulates the movements of body.

Medulla oblongata. Lies between brain and spinal cord.

Crossing of nerve fibres in *medulla oblongata*. How this indicates seat of disease or injury when paralysis occurs. Medulla oblongata, sometimes called "vital knot." Respiratory centre. In lower animals (but not in man), any other portion of nervous system may be destroyed, yet life go on for awhile. Injury to this produces instant death.

SPINAL CORD, or spinal marrow.—Situation. Composition. Both a nerve center and a conductor of nervous influence. Nerves given off in pairs. Arise by anterior (*motion*) and posterior (*sensation*)

roots. Effect upon parts below injury in spinal injuries. Direction of impressions producing *motion* and those producing *sensation*.

NERVES.—White threads. Motor nerves, sensory nerves, and compound nerves.

SYMPATHETIC OR GANGLIONIC NERVOUS SYSTEM.—Not subservient to will. Controls functions, or organic life. Circulation, respiration, digestion, secretion, etc. Always at work.

LECTURE II.

CIRCULATION OF THE BLOOD.

HEART.—Hollow muscular organ. Pumping engine. Location. Cavities. Auricles. Ventricles. Valves. Regular contraction and dilatation of heart. Pulse or blood wave. Pulmonary circulation and purposes of. Pericardium.

BLOOD VESSELS.—Arteries. Veins. Capillaries.

Arteries.—Color of blood which they contain, direction of the current, character of stream, intermittent, pump-like, or interrupted.

Veins.—Color of venous blood. Direction of current. Character of stream (steady or continuous). Valves in veins, and their uses. Veins; blue lines in skin.

Capillaries.—Small network of vessels uniting smallest arteries and veins, $\frac{1}{3000}$ inch in diameter. Point of finest needle can wound these little vessels.

THE BLOOD.—The blood alike a carrier of nutrition to tissues, and a scavenger. Composition of blood. Serum. Red corpuscles. Sixty billions of these latter in each adult in average health. Color of blood. In arteries, oxygen ; in veins, carbonic acid gas. Blood necessary for warmth as well as nourishment of body. Pulmonary circulation and its uses.

COURSE OF CIRCULATION.—Aorta as it leaves left ventricle. Innominate. Left Subclavian. Left common carotid. Innominate gives off right Subclavian and right Common carotid. Carotids and branches to head and face. Subclavian becomes Axillary. Brachial artery. Radial artery. Ulnar artery. Femoral artery. Popliteal artery.

These arteries branch to supply the adjacent parts. Veins accompany large arteries. Veins begin in capillaries and carry blood back to heart.

Recapitulation.—Arteries convey blood *to* tissues and organs, therefore direction of current in them is *from* heart. Veins convey blood *from* organs and tissues, and current in them is *toward* heart. Blood in arteries *feed* organs. Veins act as sewerage pipes to carry off waste. Capillaries—places

where tissues are fed, which take what they need from blood in arteries, and cast off what is waste or useless into veins. Blood must be purified before it can again become a food bearer; hence, functions of respiration and excretion.

RESPIRATION.

Imagine an elastic bag, placed inside a bellows and connected by a tube with the air outside the bellows. Pumping the bellows sucks air into the bag and forces it out again. Elastic bag, the lungs; bellows, the chest; and tube, the windpipe. Air enters by windpipe, which divides in tree-like branches, forming smaller and smaller tubes (*bronchial tubes*), until air-cells in lungs are reached. Net-work of vessels, connected with right side of heart, surround air-cells. *Right* side of heart sends *impure* blood as it receives it from system through *veins*; pumps it into vessels surrounding air-cells. Here oxygen from air breathed purifies blood; carbonic acid in blood leaves latter and is thrown off from system by means of air expired. Blood returns to *left* side of heart, deprived of a portion of its burden of waste matter (*carbonic acid*), and hanged from *blue* blood to *red* blood by presence

of *oxygen*. Oxygen gas necessary for certain changes in the tissues to take place, and through which changes emanate *force* and *animal heat*.

Bellows-like movements of chest produced by certain muscles, controlled partly by voluntary and partly by involuntary efforts. *Pleura*—a delicate membrane covering lungs and lining chest walls, to prevent friction between latter and former.

Not all of the waste matters of the body can be carried out through lungs, hence necessity for other organs to accomplish this. This leads to study of

EXCRETION.

ORGANS OF EXCRETION: *Lungs* (already described), *Kidneys* and *Skin*.

KIDNEYS.—Two in number. Situation. Shape. Carry off water and used-up material of tissues. Consist principally of tubes, cells and blood vessels. From blood, as it passes around cells, are taken water and other waste matter (*urea*), and these pass down tubes to basin (*pelvis*) of kidney in which it collects, to be carried by a special tube (*ureter*) into bladder. Bladder, a reservoir in which the fluid called urine (mingled water, urea and salts) is stored until it is expelled from body.

SKIN.—Covers whole of body. Filled with about three millions of sweat glands. These take from blood coming in contact with them, perspiration. This consists of three waste products, viz., water, carbonic acid and urea ; also small quantities of salt.

*Sensible perspiration—Insensible perspiration—*These two together carry to surface of body, from which it evaporates, nearly as much water as kidneys themselves (more than thirty-five ounces in twenty-four hours.)

Skin likewise forms covering of body. Not a good conductor of heat. Fat underlying it. Temperature of body maintained by skin and fat. Skin likewise seat of organ of touch.

DIGESTION.

Food to body what fuel is to furnace. Supplies to body what is used up, and the waste gotten rid of. After mastication passes to stomach through gullet (*œsophagus*.)

STOMACH.—Large muscular sac, walls of which secrete an acid juice (*gastric juice*), whose office is to prepare food for use of system. Muscular movements of stomach bringing all parts of food in



contact with gastric juice and mixing latter with former. Mass of food (*chyme*) is pushed along down alimentary canal. Some of food taken up from walls of stomach at once.

INTESTINES.—Tube nearly thirty feet long. Small intestine. Large intestine. Food not taken up from stomach is mixed with secretions or digestive juice from “sweet bread” (*pancreas*) and that of liver (*bile*) and passed down intestinal canal in soft, semi-liquid mass (*chyle*). Absorption of nutrient material occurs as the food passes down small intestine. Function of large intestine. *Ilio-caecal valve* prevents mass of waste material from large intestine from being forced back and mingling with contents of small intestine.

LIVER.—Location, size, etc.

LECTURE III.

HEMORRHAGE.

How easily lives may be sacrificed by a want of knowledge of some simple method of arresting hemorrhage. Importance of distinguishing between *arterial*, *venous* and *capillary* hemorrhage. When from an artery, owing to pumping action of heart, it comes in *jets* or *spurts*, and with some force. It is likewise of a *bright red color*. When from the veins it is *dark-colored*, *wells up*, and flows in a *steady stream*. When there is a general oozing of blood, coming in no greater quantities from one place than another, the hemorrhage is from *capillaries*. Arterial hemorrhage most dangerous and in proportion to size of artery. May destroy life in a few minutes. Death may result, however, from wounds of large veins; and in persons with certain predisposition to hemorrhage (*hemorrhagic diathesis*), even oozing from capillaries sometimes threatens life. Nature's method of arresting hemorrhage. In lacerated wounds

(railroad accidents, etc.), large arteries torn across may contract so as to stop bleeding, by diminishing size of orifice, giving blood chance to *clot*. Coagulation of blood. *Do not disturb this clot*. If a limb, *cut off* clothing, following seams, where practicable, and elevate. This failing, *pressure* must be applied. Pressure in wound itself, or pressure on vessel. Here occurs necessity for discriminating between arterial, venous and capillary hemorrhage. If arterial, pressure must be applied between heart and wound. If venous, between extremity of part and wound, *away* from the trunk or *below* point of bleeding. Direction of blood currents explains this. Methods of applying pressure as follows: Piece of rubber tubing stretched to its full length, and wound around limb while so stretched, and tied. Elastic suspenders from bystander used in same manner. Bandage limb firmly with muslin or linen, near wound, and wet this, causing it to shrink. If bleeding goes on, tube or elastic is not tightly enough applied. Above methods require no special knowledge of location of vessels. Following methods to be followed if above not available: Course of principal vessels should be again in-

pressed, particularly Carotid, Subclavian, Axillary, Brachial, Femoral and Popliteal. Improvised tourniquet of stone in handkerchief (Spanish windlass). Place loosely and twist with ramrod, sword or bayonet scabbard, or stick. Object is to crowd vessel against underlying bone. If no stone or other hard substance is at hand, hard pads of rolled-up newspaper. Try to feel pulsation of vessel before applying tourniquet. If not successful, place in position and twist until bleeding stops.

VENOUS HEMORRHAGE.—Usually controlled by handkerchief placed below wound and drawn tightly.

Bursting of varicose vein most common form of venous hemorrhage in civil life requiring services of non-professional persons. In such an emergency first elevate limb and look out for tight garters, etc., which only serve to increase bleeding. Then treat as any bleeding wound. *Avoid use of so-called styptics*, bought from apothecaries, such as “Monsel’s Solution,” powdered persulphate of iron, etc., they only befoul the wound. *Do not* use cobwebs, they are more than likely to carry infection to wound, and lead to erysipelas, etc.

CAPILLARY HEMORRHAGE generally subsides upon

exposure to air. If not, pressure with *clean* handkerchief, wrung out of simple water.

In all cases keep limb elevated, particularly if patient has to be moved.

Recapitulation.—In apparently slight hemorrhage: *First*, Cut off clothing. *Second*, Elevate limb or part, exposing limb to air. *Third*, Wring handkerchief out of cold water, and make pressure. These failing, treat it as case of *severe* hemorrhage. Crowd wet handkerchief into depths of wound with fingers. In addition, remember elastic tube or suspenders. Then, these not being obtainable, try to locate vessel and show bystander how to hold stone, etc., wrapped in handkerchief, while you, with your disengaged hand, twist until bleeding stops.

HEMORRHAGE FROM SPECIAL PARTS.

THROAT.—Stab wounds, cut throat, etc. Endeavor to push vessels backwards against spinal column, and *not* against wind-pipe. Stand behind patient and with finger-tips drag wounded part directly toward you. Or stand on same side as wound and place thumb on vessel or wound and fingers on spine, back of neck, making firm pressure.

ARMPIT.—Roll towel about small wine bottle, or similar hard substance, and crowd into armpit (Axillary artery). Roll of newspaper or stick of wood will do. Then bring arm firmly to side and fasten with strip torn from patient's shirt. Key handle, wrapped in handkerchief, pushed hard behind collar bone, pressing Subclavian artery.

ARM, ABOVE ELBOW.—Elastic tube or Spanish windlass, high up in arm (Brachial artery).

FOREARM, WRIST, HAND.—Pressure with tube, etc., below elbow. Sharply bend elbow.

KNEE OR THIGH.—Pressure as high up on thigh as possible. Femoral artery can usually be felt.

LEG OR FOOT.—Strongly and completely bend leg at knee-joint. Pressure above knee-joint (Popliteal artery).

In injuries where none of these rules apply, as those of or near the trunk, direct pressure with fingers, or compress, best.

NOSE BLEED.—Patient placed in upright position, arms raised above head. Snuff cold water up nose. Ice to bridge of nose. Cotton to plug nostrils. Latter best applied by *screwing* motion. Its effi-



ciency increased by soaking in alum solution (*teaspoonful to cupful of water*).

HEMORRHAGE FROM LUNGS.—Sometimes quite alarming. Plenty of cold air to breathe. Cold cloths to chest. Common salt, to be *eaten* if possible; if not, mix with cold water and drink. A tablespoonful of spirits of turpentine in a glass of cold milk. Turpentine poured in jug or pitcher of hot water and vapor inhaled. If hemorrhage continues, and considerable blood is being lost, tie bandages tightly about thighs and arms, so as to preserve for a time the blood in the extremities. Apply latter only in extremity, but other measures had better be all put in force at once.

IN ALL HEMORRHAGES.—Keep patient warm by artificial heat, as well as clothing. Keep a constant look out for recurrence of the bleeding, until a surgeon takes charge. Smelling salts, or hartshorn, if faintness comes on. Stimulants in moderation only until hemorrhage is under control. If tube or elastic suspenders have been used patient is pretty safe, and stimulant may be used more freely.

Endeavor to preserve, under all circumstances, your own presence of mind. A human life may depend upon it.



LECTURE IV.

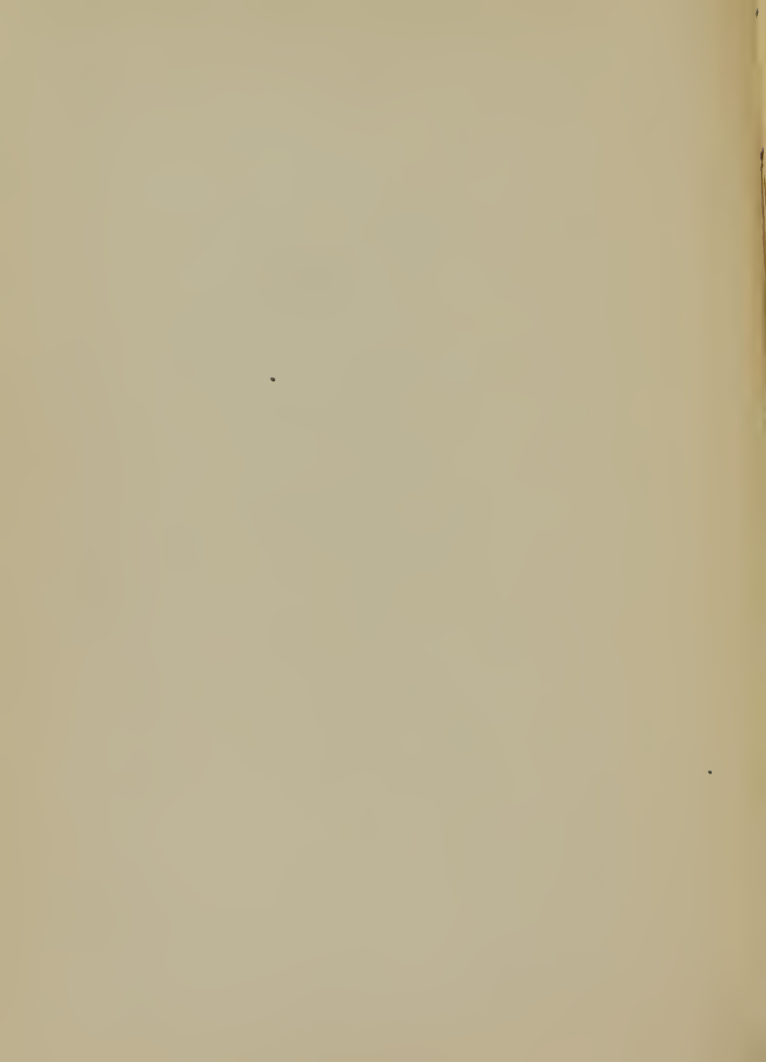
TREATMENT OF WOUNDS.

Danger of wounds in proportion to depth and size, as well as upon importance of parts involved. Wounds divided into: *First*, Clean cuts (*incised wounds*). *Second*, Wounds presenting combination of bruise and cut (*contused wounds*), as from sabre stroke, clubbed weapon, or flying, irregularly-shaped missile. *Third*, Punctured wounds, in which depth exceeds breadth, as bayonet stabs, sword thrusts, etc. *Fourth*, Wounds with torn, ragged surfaces (*lacerated wounds*).

Modern science has determined that greatest danger to wounds results from presence of irritating substances. Dirt, appreciable to naked eye, and certain impurities in common atmospheric air, not appreciable to eye, but known by their effects, chief things which produce bad conditions of wounds and lead to erysipelas and certain forms of blood poisoning. By recognizing and acknowledging



these facts, we are at once led, by very simple reasoning, to application of proper remedy. Prof. Esmarch, of Germany, has said: "The fate of a wounded man depends upon the person in whose hands he first falls." Cleanliness, washing, etc., will get rid of dirt that can be seen, but irritating matters (*germs*) floating in what might be otherwise deemed pure air, must be gotten rid of by other measures. Certain agents called *disinfectants* will destroy these minute substances. (Definition of disinfectant *not*, as popularly supposed, an agent which destroys *odors*, but one which destroys *infection*, whether it be accompanied by odors or not). Common corrosive sublimate best example of disinfectant. In treatment of wounds by a lay person, disinfectants not generally available. Another class of agents here available, viz., *antiseptics*. These *do not* destroy the irritating substances floating in air, but *do* prevent them from doing harm—paralyzes them, as it were. Carbolic acid, familiar example of an antiseptic. Even these substances not readily obtained in all situations. When corrosive sublimate is to be had, solution containing one part to one thousand of water, to wash wound.



If carbolic acid can be had, use one part of this to thirty of water. When neither can be obtained, there are two substances which are comparatively reliable in preventing poisonous germs in air from doing harm for a short time, viz., vinegar and common salt. First named to be diluted so that it will not *sting* too much. As *sour* as can be held in mouth without discomfort. One part of household vinegar to three or four parts of water (the latter previously boiled, if possible), a good proportion. Common salt dissolved in water, in proportion of a tablespoonful to a pint.

Stop bleeding, wash out wound with either of the above solutions, and place compress of linen, muslin or paper torn into narrow strips (toilet paper) and made in a cushion-shaped compress, dipped in vinegar or salt solution, upon wound. Use large and thick compress, well soaked. If linen or muslin is used, *do not* use that which is torn from patient or worn by bystanders. If clean cannot be had, paper is safer. Printed paper not objectionable. Iron in ink will do no harm. Bandage compress firmly to wound with handkerchief, also wetted with solution of salt or vinegar, and if patient is to be

carried a distance, have a supply with which to occasionally wet bandage and compress. If corrosive sublimate can be had, or carbolic acid, use in preference to above.

Do not attempt to close wound with sticking plaster, etc. If it is a large one, the surgeon had better be left to deal with it; and if small one, except it be on the face, the avoidance of a scar is of but minor importance compared with the necessity of keeping wound absolutely clean, which can scarcely be done with plaster sticking to parts.

Recapitulation.—Stop bleeding. Remove dirt. Wash thoroughly with warm water (and let this include soaping and washing parts for some distance around wound); wash with diluted vinegar or salt and water, if corrosive sublimate or carbolic acid not at hand. Compress wetted with same and bandaged over wound. In removing patient, avoid unnecessary movements of wounded parts.

FRACTURES.

Brittleness of bones. Time of life when fractures are most likely to occur. Division into simple and compound. Simple fracture a break of the bone, without wound. Compound, when bone is

driven through skin by force which breaks bone ; or when missile, such as piece of shell or rifle ball, breaks the bone and makes a wound leading to the fracture at the same time.

HOW FRACTURES HEAL.—Nature provides mass of new bone substance (*callus*) around and between fragments, and in cavity in which bone marrow forms. That which forms around outside of bones may be likened to putty, which steadies the fragments from without; that which forms between ends of fragments, comparable to glue used by cabinet-makers to fasten together pieces of wood ; while that which forms in bone marrow cavity (*medullary canal*) is the “dowel” or steadying pin, familiar to mechanics. This substance, first soft, hardens as time goes on and, after surfaces of bone become firmly welded together, disappears by absorption.

Time necessary for fracture to become perfectly consolidated varies from two to six weeks, according to size and strength of bone.

FRACTURES TERMINATE in several ways. Recovery may take place without any sign being left to indicate that patient ever suffered such an accident. This is not common in extremities. Shortening.

Deformity. Impairment of nerve function by pressure of callus, etc.

SIGNS OF A FRACTURE.—Nature of accident. If lower limb, patient cannot rise. Loss of function in any location. Patient sometimes hears or feels bone snap. Examination of limb must always be preceded by baring limb. Do not sacrifice clothing unnecessarily; cut up trowsers leg or coat sleeve on seam. Tendency for simple fracture to become compound by rough handling. *Be gentle in every movement.* Deformity: it being apparent at a glance that a distortion of the limb exists. Joint-like movement will be felt where no joint exists (*preternatural mobility*). A peculiar grating or crunching is felt and heard upon moving limb (*crepitus*). Pain in limb when it is moved. If a fracture of ribs, patient will be unable to breathe deeply or cry out loudly. If lung is wounded by piece of rib being forced into it, cough with bloody, frothy expectoration.

PROVISIONAL TREATMENT OF FRACTURES.—Compound fractures much more dangerous to life than simple ones. Here most imperatively demanded knowledge of how to treat a wound. Cut off



clothing first thing. If a compress, wet with disinfectant or antiseptic solution, can be *at once* crowded into the wound, and another one bandaged on limb over wound, the patient may have to thank this promptitude for his life. If much hemorrhage, treat as such (see previous lecture). No time should be lost in trying to "pull" bone in place.

Simple fractures best left alone until arrival of a surgeon, unless patient is to be moved. *Do not attempt*, unless patient is to be taken a distance, to put bone in place. If fracture of rib, after stripping him to skin, completely encircle *lower* part of chest with long strip of plaster as wide as your hand. In absence of this, several turns of a broad bandage torn from sheet or blanket, to be very tightly applied. By thus restraining movements of chest, sufferer can be made quite comfortable. After removing clothing make sure that fracture is not compound. If an arm, place in an ordinary handkerchief sling suspended from the neck, or one made from knapsack slings. If a leg or thigh, and surgeon is to see him where accident occurred, make patient comfortable by knapsack or pillows made of coats under his head, and blankets or

clothing thrown over him. Apply compresses wrung out of cold water to seat of fracture. If he must be moved, the neck sling and binding arm to side of body will answer for an arm. For forearm, leg or thigh, something must be done to keep fragments quiet and prevent bones from being forced through flesh, thus converting simple fracture into compound one. Locality in which accident occurs may govern choice of appliance:

First. ON THE BATTLE-FIELD.—Scabbards, bayonets, ramrods, rifle barrels, leather from horse equipments, felt from saddle-cloths, etc.

Second. IN A TOWN OR HOUSE.—Cigar boxes, pieces of shingles, laths, broom-sticks, yard measures, covers of books, chip or straw hats, folded newspapers, coat rolled up with sleeves turned wrong side out, and rolled from each edge toward centre, leaving space in centre for limb to rest. From the kitchen, tongs, long poker, fire shovels, cooking spoons, etc.

Third. ON A PUBLIC STREET.—Crowd will probably collect. Borrow ladies' sunshades, gentlemen's walking canes or umbrellas.

Fourth. IN A MACHINE SHOP OR FACTORY.—Strips of leather belting covered or padded with cotton waste, fastened to sides and back of limb, make an excellent splint.

Fifth. ON A COUNTRY ROAD OR IN A FOREST.—Pieces of fence, branches, twigs or bark of trees. reeds, straw made into bundles, etc. Sleeves removed from garments and stuffed with hay or grass, Stocking legs prepared in same manner. Pad splints with folds of muslin, wool, cotton, flannel, flax, jute, hay or moss. Bandages to hold splints in position: Triangular bandages, handkerchiefs, pieces of patient's clothing torn into strips. In fracture of lower extremities, as an additional security fasten the patient's limbs together at ankles and knees, so that the sound limb acts as a support to the other.

LECTURE V.

DISLOCATIONS.

A continued displacement of bones forming a joint, from their natural relations to each other. Ligaments must be torn, in order that this may occur. Caused by force exerted in a direction in which the joint was not intended to be moved.

Dislocations of thumb, fingers, toes, shoulder, elbow and hip occur as to frequency, in the order named.

Dislocations are recognized by following signs :

1. Manifest deformity ; baring opposite limb and comparing corresponding joint on other side will show this clearly.

2. The joint cannot be moved in its normal directions. It is locked, so to speak, and muscles attached to bones forming joint are irritated, and assist, by their contraction, in keeping the joint rigid.

3. Agonizing pain is produced by attempts to move the joint.

TREATMENT OF DISLOCATIONS.—Although it is quite necessary that a dislocation should be promptly reduced, yet the manipulation requires a great deal of care. Large blood vessels have been torn and lives lost in making violent efforts to replace a displaced bone. On this account the surgeon should be promptly summoned, or the patient taken to him. Cold compresses in the meanwhile.

SPRAINS.

Sprains may be defined as forcible tearing, stretching or twisting of the soft parts composing or surrounding joints, together with, in severe cases, bruising or contusion of the joint surfaces themselves.

Sprains to be distinguished from dislocations by absence of deformity (compare with corresponding joint on other limb).

Sprained joints swell very rapidly, are very painful, and movements become difficult as well as painful. Recovery takes place slowly.

TREATMENT OF SPRAINS.—Place part in an easy position until surgeon arrives. Apply cold compresses (ice water if at hand), or transport patient to the surgeon.

If medical advice is not to be promptly had, relief may be obtained by immersing the part for half an hour in water as hot as can be borne, and adding fresh hot water from time to time ; then apply hot fomentations. Heat and cold equally useful, but act in different ways.

Bandaging part with wet bandage and keeping it in elevated position. Rubbing useful, but to be only used upon medical advice. Basket-strapping and bandaging enables patient to get about much sooner than too much "nursing" of limb, but must be properly done and by surgeon. Avoid the class of quacks calling themselves "bone-setters."

BURNS AND SCALDS.

Many deaths caused by these accidents. Burns caused by heat of fire, or action of chemical agents. Scalds produced by boiling liquids or steam. "Eschars" produced by strong caustics, such as caustic potash or oil of vitriol.

Burns divided into three degrees, according to severity :

- 1.—Simple reddening of skin.
- 2.—Severe enough to blister in addition to above.

3.—Severe enough to “char” skin and produce ulceration.

In second and third degrees of burning, particularly if the area involved be large, medical adviser should be immediately summoned. Grave disturbances may result.

TREATMENT OF BURNS AND SCALDS.—Patient’s clothing to be removed most carefully and cut in places where it adheres. If attempts are made to pull off clothes, blisters will be torn open and large raw surfaces exposed. False economy to attempt to save clothing under such circumstances. Warm, stimulating drinks to be given.

Should the doctor not have arrived when you have reached this point, prick the larger blisters in several places in order to let out contents. Do not, on any account, raise blister or remove it. Put a heaping teaspoonful of baking soda (bicarbonate of soda) in a pint of warm water, stir well, dip pieces of old linen or muslin in this and carefully cover burns or scalded places. This relieves pain as promptly as anything until medical aid can be obtained. Lay sheet-wadding over these and cover patient with blanket. Keep linen or muslin wet

with solution, so that they will not stick when removed for inspection. In case of severe burns or scalds to back, where it is difficult to re-apply dressings often, use "Carron Oil" (equal parts of lime-water and linseed oil), applied with soft muslin or linen.

In limited area of burns (hands, arms or feet), open blisters and dredge with flour; afterwards enveloping in cotton batting.

After-treatment of burns and scalds to be carried on by surgeon, as this involves the application of antiseptic dressings to absorb the discharges from skin, which have an especial proneness to putrefy, and thus increase risk to patient. (See Lecture on "Treatment of Wounds.")

Burns from caustic lye, etc., to be immediately treated with diluted vinegar. Burns from acids, vitriol, etc., to be neutralized at once by solution of washing or baking soda. Lime-water useful; may be at once procured by breaking out piece of plaster or mortar from wall, crushing it, and stirring it in some water.

SUN-STROKE.

Remove patient to a cool and shady place ; loosen collar and remove necktie, as well as tight clothing from chest. Elevate head. Dash cold water over head and face. Patient should be kept in recumbent position and crowd kept back. *Give no alcoholic stimulants.* Summon medical advice as soon as possible.

FROST-BITE.

Predisposing causes. May occur when cold is not very intense. Persons not robust, or addicted to drink, most liable to frost-bite. Gen. Woolsey's experience in northwestern campaign in Canada goes to show that troops to whom rations of alcoholic stimulants are not issued regularly, are less likely to suffer from frost-bite. Persons snowed under are more easily resuscitated, because snow is a bad conductor of heat. In those frozen, whole surface becomes white and cold. Limbs stiffen. Nose, lips and finger-tips become blue.

TREATMENT OF FROST-BITE.—Carry patient to closed room, without a fire. *Reaction must be brought about very gradually.* Undress him carefully. If snow is to be had, rub with vigor and

continuously the frozen parts or whole of body. Never apply heat at this period of the treatment. A little warm coffee or stimulant may be given him from time to time. Give hartshorn to inhale. If snow is not to be had, use Turkish towels wrung out of cold water; or rough cloth; or put patient in a cold bath. If patient ceases breathing, use artificial respiration. As reaction comes on, carry patient to a room slightly warmer and cover loosely with a blanket. Afterward rub with a warm cloth.

BITES OF RABID ANIMALS.

Wound should be sucked and then bathed in warm water. Tie bandage or handkerchief tightly about limb, between wound and heart. Caustic, preferably nitric acid. Allay fears of hydrophobia. Snake bites best treated by free use of stimulants. Sting of insects by ammonia in solution.

LECTURE VI.

DROWNING.

Death from drowning results from one of two causes :

First.—In attempts at respiration while the person is beneath the water, the latter forces its way into the lungs instead of air. Peculiar appearance of body of person perishing in this manner. Mouth is filled with froth; lips are livid; face swollen and purplish in color; eyes bloodshot.

Second.—Spasm of entrance to windpipe may occur, and at same time faintness comes on; heart-beat and efforts at respiration are very feeble and may cease altogether, and thus but little water enters lungs. Mouth of person has but little if any frothy fluid in it, and face is pale and not swollen.

First method, most common and not the easy, painless death popularly supposed. Resuscitation not easy.

Second manner of death occurs more rarely, is painless, and efforts at restoration to life more generally successful.

Instances are on record where persons apparently drowned have been restored to life after many hours have elapsed; hence, even most desperate appearing cases should not be abandoned until pronounced hopeless by medical man.

TREATMENT.—Do not fear to do anything needful for such a case because a coroner or magistrate has not seen body. Popular belief that whoever moves body from position found in or placed by rescuer is responsible to law, an error. Anything holding out slightest hope of restoring life allowable.

Do not waste time in trying to inflate the lungs of patient by applying your own lips to his and blowing your own breath into his body. This only inflates his stomach and intestines, and can do no possible good.

Take immediate steps to resuscitate patient. Carry on efforts quietly and with caution. Above all things, *persevere*.

Points to be observed in treatment of persons ap-

parently dead from drowning: First and most important, *immediate restoration of breathing*; second, *promotion of warmth and circulation*.

Knowledge needful for such an emergency best fixed in mind by set of rules.

First.—Cut, tear or otherwise remove as rapidly as possible, *all* clothing from chest and abdomen of patient. While this is being done, dispatch one or more messengers for medical help, and a messenger for dry, warm clothing and blankets. Dry skin. Reasons: Exposure of surface of chest and abdomen to air helps to excite respiration; besides, artificial respiration better carried on when sleeves of garments, suspenders, etc., have been removed. Warm clothing needed as soon as natural breathing is established.

Second.—Rapidly force open mouth, wipe out froth, and with a handkerchief covering thumb and fingers draw out tongue. This clears the way for entrance of air. Covering thumb and fingers prevents tongue from slipping between them.

Third.—Place patient on stomach with bundle of clothing under him so that head will be on some-

what lower plane than chest and abdomen. Place one arm under his head. The common practice of suspending patient by heels is to be discouraged, as well as that of rolling him over a barrel. In the position indicated whatever fluid necessary to get rid of before commencing artificial respiration will flow out. To facilitate this, press two or three times forcibly, with palms of your hands placed between patient's shoulder-blades.

Fourth.—Commence artificial respiration, after Sylvester's method, as soon as possible. Open air to be preferred, unless inclemency of weather forbids. Nothing can be done with advantage for patient until breathing is established. Do not stop to slap hands, rub extremities, etc. In open air patient gets relatively larger proportion of oxygen.

Fifth.—Artificial respiration, performed after Sylvester's method, preferable to any other. Has the advantage that it may be performed by one person. (Sylvester's method of artificial respiration to be demonstrated.) These movements repeated about fifteen times in a minute till natural respiration begins. Encouraging signs consist of changes of color in face and spasmodic gasps. Pause occa-

sionally, when latter occurs, to see if patient will breathe for himself. As soon as he does so, desist from further efforts in that direction.

Sixth.—Restore circulation as well as warmth to body. Cover over body with blanket; rub limbs upwards vigorously (forcing blood in veins towards heart) under cover of blanket. Here bystanders can help. On no account allow these latter measures to be employed until respiration has been established. Harm may be done.

Seventh.—Put patient to bed. Apply artificial heat by hot bottles, hot bricks rolled in newspapers, etc. When able to swallow, give warm drinks in small quantities (warm spiced wine and water, warm tea or coffee, brandy and water, etc).

During above manipulations let one person attend to keeping tongue out. Person making artificial respiration to be relieved occasionally.

SUFFOCATION.

Inhalation of poisonous vapors common cause, viz.: illuminating gas; charcoal vapor; carbonic acid.

TREATMENT.—Remove patient to open air. Rescuer should not take too much risk. Door of room should be opened and closed rapidly several times; this acts as a fan and forces air in the room to dilute noxious vapor. Handkerchief to be wet with vinegar and water and held to mouth, while he rushes to nearest window and breaks a pane of glass. He gets fresh air from this source, and then repeats at another window. Door to be kept fanning all the time. Patient then to be carried out of the room and to fresh air. Dash cold water in face and on chest. Keep up warmth of body by hot bottles, etc. Artificial respiration as in case of drowned person. Mustard plasters to region of heart and extremities. Stimulants.

HANGING.

Support body by clasping it firmly to one's own chest with one arm, and with other hand cut rope by which it is suspended.

TREATMENT.—Same as in suffocation.

POISONS.

Any substance taken internally in sufficiently large quantities to produce death is a poison.

Divided into irritants and narcotics.

First. IRRITANT POISONS.—Substances which produce irritation, inflammation and destruction of parts with which they come in contact, together with great pain. Examples: Caustic lye, strong acids, oxalic acid, corrosive sublimate in strong solutions, as sometimes used for vermin poison, Paris green and other preparations of arsenic, “Rough on Rats,” etc.

Second. NARCOTIC POISONS.—Opium, morphine, alcohol, prussic acid; all substances producing torpor, delirium and insensibility.

TREATMENT OF POISONING.

In irritant poisons, most important to discover its nature, if possible. Here, an antidote immediately administered more important than production of vomiting. In case of an acid having been taken, give an alkali at once. Soda, magnesia, lime-water. Scrape whitewashed or kalsomined wall, and stir scales of lime thus obtained in cup of water. Afterwards induce vomiting. Teaspoonful of mustard or salt in cup of warm water, drank after antidote. In case of an alkali, such as caustic

lye, pearline, and such washing compounds, resort at once to vinegar or lemon juice as antidotes ; then give emetic, or produce vomiting with finger thrust well back over root of tongue.

In all cases of irritant poisoning, if proper antidote be not at hand, give white of eggs, flour and water stirred up together, or milk, in order to protect lining of stomach until latter can be emptied by emetic.

Narcotic Poisons.—These will usually be absorbed before vomiting can be produced. Prevent patient from falling asleep. If conscious, *compel* him, if a would-be suicide, to drink strong black coffee ; if unconscious, give it by injection. Mustard to stomach and extremities (calves of legs, and inside of thighs). If he stops breathing use artificial respiration.

If piece of rubber tubing the size of little finger and two feet long can be obtained, it can, if patient is conscious and will make swallowing efforts, be readily passed into stomach. A funnel upon its outer extremity and a pitcher of warm water thus complete a very efficient apparatus for washing out stomach. With funnel end elevated,

fill stomach ; then lower until it is emptied. Repeat several times. Do not attempt to use tube if patient cannot or will not swallow.

Stomach pump will be used by surgeon, who should be promptly summoned.

LECTURE VII.

FOREIGN BODIES IN THROAT, NOSE, EYE AND EAR.

Choking generally caused by pieces of food, etc., lodging in throat and closing windpipe. Sometimes death ensues very rapidly.

Grasp nose with left hand. If patient has become unconscious and fallen, force him into a sitting position; crowd handle of table knife or fork between his teeth; any hard substance will answer. Force finger to root of tongue and press latter down; this is intended to give room for foreign body to move, and at same time induce vomiting. If substance can be felt, hook finger and drag it out. Failing in this, pass two fingers to root of tongue and try to catch hold and dislodge. Several smart blows upon back, between shoulder blades. force air from chest, and this may serve to dislodge.

Do not fail, in sending for medical aid, to ac-

quaint surgeon with nature of case. Special instruments needed.

Foreign body in nose not dangerous to life, and may be allowed to remain until arrival of surgeon. In case none be at hand, a wire loop like a hairpin, passed beyond point of lodgment and withdrawn, will bring it out. Remember that direction of cavity of nose is rather toward back than toward top of head.

Foreign body in eye, one of commonest forms of lesser accidents of daily life. Very painful and irritating. Unless the foreign body be of the nature of mortar or other caustic substances, do not rub and worry the eyes; this only serves to increase irritation. Close lids, so that tears, which flow in abundance, may serve to loosen and wash away foreign body; look for it at edge of lids. If this does not succeed, look for it under upper lid, after folding latter back over a match or toothpick. Have patient move eye in various directions. If piece of iron or steel is embedded in eye-ball, fine cambric needle best instrument in hands of laymen, for its removal. Services of surgeon should be sought if it does not move readily.

Mortar, lime, etc., should be at once washed out with vinegar and warm water (teaspoonful of vinegar to two tablespoonfuls of water).

Foreign bodies in the ear, unless quite within sight, should only be treated by a professional man. If it be a living insect, pour warm water or oil from a teaspoon into the ear, and it will soon attempt to make its egress and rise to the surface. If not, it will quickly perish. Use no probes, hair-pins, etc., or great and irreparable damage may be done. The method adopted by boys to remove water from ears when coming out of the bath—that of holding the head sideways, with the affected side down, and hopping vigorously upon the foot of the same side may be tried. Small bodies thus readily shaken out. Syringing *gently* with warm water as last resort if medical help be not within easy call.

INSENSIBILITY.

Chief causes of loss of consciousness :

First.—Blows upon the head producing injury to the brain, with or without fracture of the skull.

Second.—Diseases of the brain, apoplexy, etc.

Third.—Poisoning by alcohol.

Fourth.—Narcotic poisons ; opium, morphine, chloral.

Fifth.—Uræmia ; poisoning of the blood from retention of waste matters intended to be carried off by kidneys. Bright's disease of kidneys cause of this.

Sixth.—Fainting, from failure of heart's action.

Difficulty often experienced by professional men in distinguishing at first between them. Safest plan to follow, instead of speculating as to whether man is drunk or sick, is to treat him as if sick. Do not jump to the conclusion that he is drunk because his breath smells of liquor. He may have felt illness coming, and taken stimulant to ward it off, or bystander may have poured some between his lips. In all cases act as follows :

First.—Force back the crowd ; give plenty of air.

Second.—Place body upon back. If face is *pale* lower head ; if face is *red*, raise head slightly above level of body.



Third.—If he has a “fit,” crowd substance between teeth to prevent biting of tongue. Only gentle restraint of his movements allowable. Maniacal attacks sometimes follow epileptic convulsions.

Fourth.—Note surroundings ; possibility of foul play.

LECTURE VIII.

TRANSPORTATION OF THE INJURED.

Ambulance systems in use in large cities render it unnecessary for patient to be carried to a distance by means of stretchers, etc. In towns and the rural districts, however, and in active military service, a knowledge of best methods of conveying the wounded quite essential. If patient is to be carried but a short distance, simplest method is to have him sit on hands of two bearers, who pass each a hand beneath his thighs and another behind his back, low down, clasp their hands tightly together and lift him gently. Patient places an arm around neck of each bearer.

Above method preferred to "Sedan" or "Dandy" chair.

For an unconscious person, one bearer should station himself between the patient's legs and grasp beneath the knee-joints by hooking bends of his own elbows beneath the limbs. The first or leading

bearer should have his back turned toward patient's face. Rear bearer supports patient's back against his own chest, passes his arms underneath patient's arm-pits, and locks his fingers firmly over patient's breast.

In public street or in a house, sofas, window shutters, boards, a door removed from its hinges, benches, chairs, etc., usually to be obtained; blankets, counterpanes, mattresses, rugs, etc., carried by four corners.

How to assist an injured person who is yet able to walk, and when but one person is present to render aid.

In active military service transportation of wounded in a painless manner of the utmost importance. Here stretchers may be improvised for conveyance of wounded to the rear or to the hospital tent, as follows:

First.—Simple camp cots.

Second.—Stretchers made from coats with sleeves turned wrong side out, and rifle barrels passed through these as handles. Coats buttoned across them. Two or three knapsacks fastened between two muskets by their straps. Belts, saddle girths,

knapsack straps, bridles, stirrup-straps, etc., are usually plentiful in active service, and may be strung between two rifles or guidon staffs.

Stretcher Drill.—Select men as bearers of same height if possible. Three men to each stretcher; two to carry, and the third to attend to wounded man, give commands, and change off with other two. Bearer who marches in front is No. 1, bearer who marches behind is No. 2, and the one who looks after the patient is No. 3. Placing stretcher: one end to be placed at patient's head, and laid in same direction as his body.

Placing Patient on Stretcher.—No. 3 commands "Fall in." Nos. 1 and 2 face each other with patient between them, and standing near his hips. No. 3 grasps injured limb or part. No. 3 now gives word "Ready." Nos. 1 and 2 stoop down and place each a hand beneath the shoulder blades of patient and lock them. The other hands are passed beneath the upper third of thighs and clasped. All being in readiness the limb is steadied by No. 3, who at the same time gives the order "Lift." The patient is then slowly lifted. At the word "March" by a slow sideways step they carry the patient until

his head reaches the further end of the stretcher, when the word "Halt" is given. At this the bearers steady themselves and at the word "Lower" they carefully deposit the patient upon the stretcher.

Starting the Stretcher.—Command by No. 3 "Fall in," at which Nos. 1 and 2 take position at head and foot of stretcher. At command "Ready," they grasp handles or adjust shoulder straps of stretcher. At word "Lift," slowly and carefully lift stretcher.

Marching with Stretcher.—No. 1 steps off with left foot, when order "March" is given, and No. 2 steps off with right foot, and this break step is continued until order "Halt" is given. Stretcher bearers should march with a slightly stooping posture and knees somewhat bent. After order "Halt" is given, the bearers prepare to place the patient upon the ground or floor and at the word "Lower" this is accomplished, after which the bearers fall out without further orders. Patient to be lifted from stretcher to bed or cot in the same way that he is placed upon the stretcher. In going up hill, patient's head should always be in front, *except when he has broken thigh or leg*, in which case





reverse the order. In going down a hill let the patient's head be behind, *except in case of broken thigh or leg*, in which case again reverse. The orders, upon arriving at the foot or summit of a hill are "Halt," "Reverse," at which the bearers turn the stretcher half way around. "Lower," deposits the patient upon the ground, with his head in the proper direction. Then the same commands are given as in starting the stretcher originally.

SIGNS OF DEATH.

Notwithstanding prolonged suspension of respiration and circulation, life may not be extinct. If patient is really dead, it may be of the greatest importance that it be known. Prolonged and useless efforts are but waste of time under such circumstances, and in cases where others require aid, an injustice to them. On the other hand, when it is remembered that during the last hundred years there are records of no less than 125 persons erroneously considered dead (of these, 54 were buried alive, and 4 dissected alive), it will be at once seen and appreciated how necessary it is that some knowledge upon this subject be possessed by those who may be called upon to decide.

Only indubitable sign of death is commencement of putrefaction. An unfailing criterion other than this, and capable of being applied by non-professional persons, not yet discovered. No one sign to be relied upon, but several must be combined.

Cessation of heart's action difficult to demonstrate. Place ear to chest in neighborhood of or just below left nipple, and listen intently.

Tying a string tightly around a finger or toe is an old method. In death no change occurs, but if circulation be going on, however feebly, the end of the toe or finger becomes quite livid from arrest of flow of blood from finger through veins. At the same time a narrow band of white will be seen at the point tied.

The respiratory movements may be so reduced both in frequency and force, especially in poisoning by opium, morphine, etc., that they can be detected only with great difficulty. Popular methods of holding a cold mirror to face and looking for indications of moisture; placing bit of cotton, wool or piece of feather on lips, to ascertain if air currents exist, and placing a glass of water upon surface of chest or abdomen, and watching to see if

deflections on its surface remain still or move, are all useful.

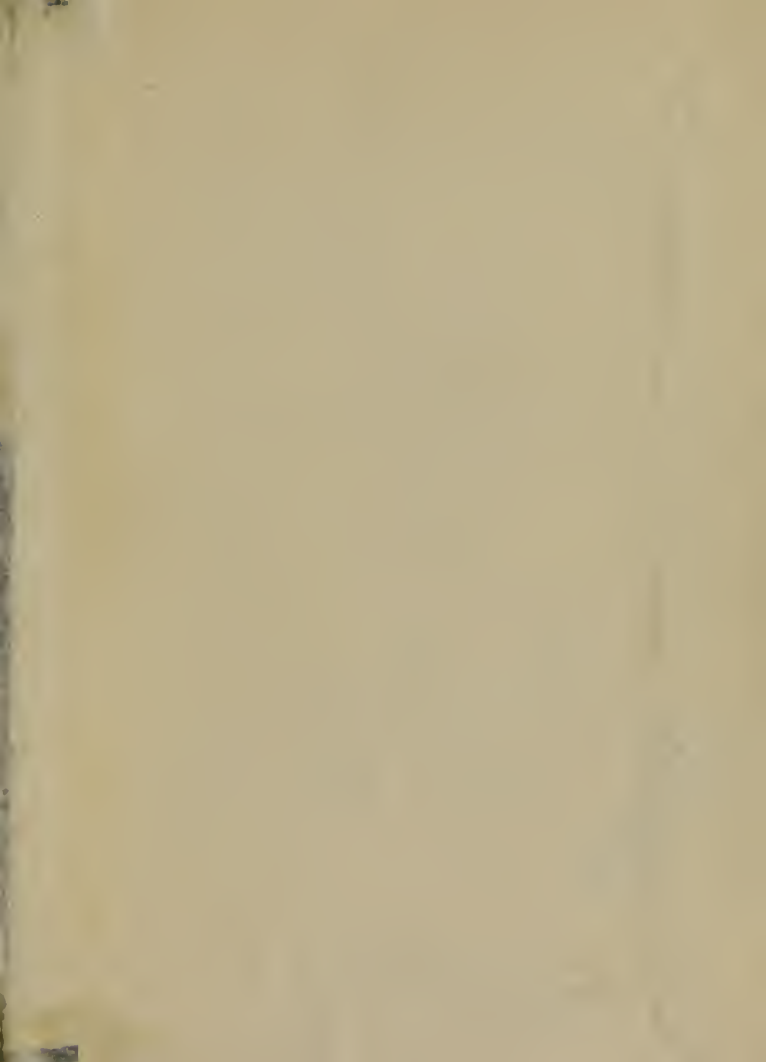
Collection of froth about nostrils and mouth, of value, indicating failure of respiration.

Shrunk appearance of features (*facies Hypocritica*), occurring in last agony, quite characteristic. Nose is pinched, lips are cold, livid, and have lost their characteristic elasticity, as evinced by their failure to cover teeth when they have been drawn away from latter. Skin ashy pale.

Peculiar vacant stare of eye; lighted match causes no difference in pupil when brought near to or removed from eye; pupil dilated.

Conditions most resembling death are : fainting (*syncope*), suffocation (*asphyxia*) and trance.





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